**Andrew Trail – Crypto Tracker Testing**

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# Test Plan

I will be testing my software using various methodologies and techniques, both black and white box.

Throughout the development process I have done a great deal of both Unit Testing and Interface Testing in order to get the functions working correctly on their own and with each other. Details of some of the bugs I’ve come across and their workarounds are in the included “Progress Log.txt” file.

I will be performing recorded Unit Testing on all functions. Interface testing is also included in most functions, in the cases that a database file must be open for the function to work, or the display is updated.

Once the white-box testing is complete I will begin black box testing. Here I will run the software .exe and perform system testing, compliance testing and UI testing.

I will have a separate set of test data for the system testing and will record appropriately.

Compliance testing will be done simply to check both the functional and non-functional requirements set out in the Analysis stage of development.

Finally, I sent the software to a few friends to see if it would run on a variety of systems, as well as to get feedback from them.

# White Box: Unit & Interface Testing

Here I will go through each of the individual functions and test Normal, Extreme and Exceptional data where possible

**“createTable” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| Normal name: “test1” | Database created with table and blank records for 3 coins. Displayed on main form | Database created with table and blank records for 3 coins.  Displayed on main form | As expected |
| Normal name: “test2” | Database created with table and blank records for 3 coins.  Displayed on main form | Database created with table and blank records for 3 coins.  Displayed on main form | As expected |
| No name: “” | No database created until a name is entered. | No database created until a name is entered. | As expected – Could add error message showing accepted input |
| Invalid name: “ “ | No database created until a name is entered. | No database created until a name is entered. | As expected – Could add error message showing input as expected |

**“saveNew” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| Normal name: “test1” | New database file with current data created | New database file with current data created | As expected |
| Normal name: “test2” | New database file with current data created | New database file with current data created | As expected |
| No name: “” | No database created until a name is entered. | No database created until a name is entered. | As expected – Could add error message showing accepted input |
| Invalid name: “ “ | No database created until a name is entered. | No database created until a name is entered. | As expected – Could add error message showing input as expected |

**“insert” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| Add 1 BTC to DB file | “Holdings” and “Holdings Value” row in table updated to show + 1BTC change. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show + 1BTC change. Label at top left of form updated to display total value | As expected |
| Add 5LTC to DB file | “Holdings” and “Holdings Value” row in table updated to show + 5LTC change. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show + 5LTC change. Label at top left of form updated to display total value | As expected |
| Add 10VTC to DB file | “Holdings” and “Holdings Value” row in table updated to show + 10VTC change. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show + 10VTC change. Label at top left of form updated to display total value | As expected |
| Add 0BTC to DB file | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Add 0LTC to DB file | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Add 0VTC to DB file | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Add -1BTC to DB | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Add -1LTC to DB | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Add -1 VTC to DB | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Add 1.5 BTC to DB | “Holdings” and “Holdings Value” row in table updated to show a + 1.5 BTC change. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show a + 1.5 BTC change. Label at top left of form updated to display total value | As expected |
| Add 2.2 LTC to DB | “Holdings” and “Holdings Value” row in table updated to show a + 2.2 LTC change. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show a + 2.2 LTC change. Label at top left of form updated to display total value | As expected |
| Add 6.935 VTC to DB | “Holdings” and “Holdings Value” row in table updated to show a + 6.935 VTC change. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show a + 6.935 VTC change. Label at top left of form updated to display total value | As expected |
| Non numeric entered | Nothing should be entered in box | Nothing is entered in box | As expected |
| Nothing entered | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |

**“edit” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| Edit BTC holdings to 11 | “Holdings” and “Holdings Value” row in table updated to show 11BTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 11BTC. Label at top left of form updated to display total value | As expected |
| Edit LTC holdings to 3 | “Holdings” and “Holdings Value” row in table updated to show 3LTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 3LTC. Label at top left of form updated to display total value | As expected |
| Edit VTC holdings to 69 | “Holdings” and “Holdings Value” row in table updated to show 69VTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 69VTC. Label at top left of form updated to display total value | As expected |
| Edit BTC holdings to 0 | “Holdings” and “Holdings Value” row in table updated to show 0 BTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 0 BTC. Label at top left of form updated to display total value | As expected |
| Edit LTC holdings to 0 | “Holdings” and “Holdings Value” row in table updated to show 0 LTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 0 LTC. Label at top left of form updated to display total value | As expected |
| Edit VTC holdings to 0 | “Holdings” and “Holdings Value” row in table updated to show 0 VTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 0 VTC. Label at top left of form updated to display total value | As expected |
| Edit BTC holdings to -1 | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Edit LTC holdings to -69 | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Edit VTC holdings to -5 | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |
| Edit BTC holdings to 1.95678 | “Holdings” and “Holdings Value” row in table updated to show 1.95678 BTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 1.95678 BTC. Label at top left of form updated to display total value | As expected |
| Edit LTC holdings to 3.14159 | “Holdings” and “Holdings Value” row in table updated to show 3.14159 LTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 3.14159 LTC. Label at top left of form updated to display total value | As expected |
| Edit VTC holdings to 15.2222 | “Holdings” and “Holdings Value” row in table updated to show 15.2222 VTC. Label at top left of form updated to display total value | “Holdings” and “Holdings Value” row in table updated to show 15.2222 VTC. Label at top left of form updated to display total value | As expected |
| Non numeric entered | Nothing should be entered in box | Nothing entered in box | As expected |
| No num entered | No changes made to database or display. Error message with valid input shown | No changes made to database or display. Error message with valid input shown | As expected |

**“scrapeCoin” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| n/a | Current USD price of Bitcoin, Litecoin and Vertcoin, according to Coinmarketcap.com | Current USD price of Bitcoin, Litecoin and Vertcoin according to coinmarketcap.com | As expected |

**“calcVal” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| “1” BTC at price = $6988.03 | BTC Holdings Value = $6988.03 | BTC Holdings Value = $6988.03 | As expected |
| “25” LTC at price = $118.82 | LTC Holdings value = $2970.28 | LTC Holdings value = $2970.28 | As expected |
| “5” VTC at price = $1.74 | VTC Holdings value = $8.70 | VTC Holdings value = $8.70 | As expected |
| “0” BTC at price = $6988.03 | BTC Holdings Value = $0 | BTC Holdings Value = $0 | As expected |
| “0” LTC at price = $118.82 | LTC Holdings value = $0 | LTC Holdings value = $0 | As expected |
| “0” VTC at price = $1.74 | VTC Holdings value = $0 | VTC Holdings value = $0 | As expected |

**“dsp” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| Display data on initial main form opening | Holdings displayed in “$” | Holdings displayed in “$” | As expected |
| Display data when currency remains the same. After “Add” button clicked, and that form completed | Holdings display refreshed with currency remaining the same | Holding display refreshed with currency remaining the same | As expected |
| Display data when currency remains the same. After “Edit” button clicked, and that form completed | Holdings display refreshed with currency remaining the same | Holdings display refreshed with currency remaining the same | As expected |
| Change currency using “toggle” button | Holdings display refreshed with next currency | Holdings displayed with next currency | As expected |
| Display data when new database is opened | Holdings displayed for new database file | Holdings displayed for new database file | As expected |

**“genPie” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| Create pie chart from blank holdings | Blank png file output | Blank png file output | As expected |
| Create pie chart when data is input | Pie chart of holdings saved as a png | Pie chart of holdings saved as a png | As expected |

**“currencyTog” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| “Toggle” button is pressed from “$” | Should convert and display all currency items in £ | Prices are all converted and displayed in £ | As expected |
| “Toggle button is pressed from £” | Should convert and display all currency items in € | Prices are all convert and displayed in € | As expected |
| “Toggle button pressed from “€” | Should convert and display all currency items in $ | Prices are all converted and displayed in “$” | As expected |

**“main” function**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| **Main form functionality** |  |  |  |
| Button press “Add a transaction” | Add transaction form is displayed | Add transaction form is displayed | As expected |
| Button press “Edit Holdings” | Edit transaction form is displayed | Edit transaction form is displayed | As expected |
| Button press “Toggle Currency” | Currency displayed is converted to next currency and outputs refreshed using “dsp” and “currencyTog” functions | Currency displayed is converted to next currency and outputs are refreshed using “dsp” and “currencyTog” functions | As expected |
| Button press “Generate Pie Chart” | Windows save dialog opens with option to save a png with “genPie” function | Windows save dialog opens with option to save a png with “genPie” function | As expected |
| Button press “Open Different Folio” | Windows open file dialog with option to choose a .sqlite file. Data from file is displayed using “dsp” function | Windows open file dialog with option to choose a .sqlite file. Data from file is displayed using “dsp” function | As expected |
| Button press “Save” | Windows save dialog open with option to save a .sqlite file using “saveNew” function | Windows save dialog with option to save a .sqlite file using “saveNew” function | As expected |
| Button press “Quit” | Execution ends | Program execution ends | As expected |
| **“Add” form functionality** |  |  |  |
| Button press “Add” with valid data | “insert” function called and the data added to the current database | “insert” function is called and the data is added to the current database | As expected |
| Button press “Add” with invalid data | Error box displaying valid data displayed | Error box displaying valid data is displayed | As expected |
| Button press “Cancel” | “Add” form hidden and main shown | “Add” form is hidden and main form is shown | As expected |
| **“Edit” form functionality** |  |  |  |
| Button press “Edit” with valid data | “edit” function called and database is adjusted accordingly | “edit” function is called and database is adjusted accordingly | As expected |
| Button press “Edit” with invalid data | Error box displaying valid data displayed | Error box displaying valid data is displayed | As expected |
| Button press “Cancel” | “Edit” form hidden, main form shown | “Edit” form is hidden, main form is shown | As expected |
| **“Init” form functionality** |  |  |  |
| Button press “Existing” | Windows open form with option to open a .sqlite file using “dsp” function. If successful, this form is hidden and main is shown | Windows open form with option to open a .sqlite file using “dsp” function. This form is hidden and main is shown | As expected |
| Button press “New” | Windows save form with option to create a .sqlite file using “createTable” function. This form is hidden and main is shown | Windows save form with option to create a .sqlite file using “createTable” function. This form is hidden and main is shown | As expected |
| Button press “Exit” | Execution ends | Execution ends | As expected |
| Correct layout displayed on “init” form | Buttons “Existing”, “New”, and “Exit” displayed | Buttons “Existing”, “New”, and “Exit” displayed | As expected |
| Correct layout displayed on “main” form | Total folio value displayed. Buttons for Add, Edit, Toggle, Pie chart, Open, Save and Quit. Table displaying holdings | Total folio value displayed. Buttons for Add, Edit, Toggle, Pie chart, Open, Save and Quit. Table displaying holdings | As expected |
| Correct layout displayed on “Add” form | Option box for coins displayed. Entry box for no. coins. Buttons for Add and Cancel | Option box for coins displayed. Entry box for no. coins. Buttons for Add and Cancel | As expected |
| Correcy layout displayed on “Edit” form | Option box for coins displayed. Entry box for no. coins. Buttons for Edit and Cancel | Option box for coins displayed. Entry box for no. coins. Buttons for Edit and Cancel | As expected |

# Black box Testing – System Testing & UI Testing

Here I will test all buttons work as expected, and work together as a whole program smoothly.

|  |  |  |  |
| --- | --- | --- | --- |
| **Test/Data** | **Expected Output** | **Actual Output** | **Comments** |
| **Initial form functionality** |  |  |  |
| “Existing” button pressed | Dialog to open existing database shown. When a file is selected, its displayed on main form | Dialog to open existing database shown. When a file is selected, its displayed on main form | As expected |
| “New” button pressed | Dialog to create a database shown. Blank data shown on main form load | Dialog to create database is shown. Blank data shown on main form load | As expected |
| “Quit” button pressed | Program ends | Program ends | As expected |
| **Main form functionality** |  |  |  |
| “Add a transaction” button pressed | Add transaction form displayed | Add transaction form displayed | As expected |
| “Edit Holdings” button pressed | Edit transaction form displayed | Edit transaction form displayed | As expected |
| “Toggle Currency” button pressed | Label and table are shown converted to another currency | Label and table are updated with converted values | As expected |
| “Generate Pie Chart” button pressed | Pie chart generate dialog shown | Pie chart save dialog shown | As expected |
| “Open different folio” button pressed | Dialog allowing a .sqlite file to be opened displayed | Dialog allowing a .sqlite file to be opened is displayed | As expected |
| “Save” button pressed | Dialog allowing a .sqlite file to be created displayed | Dialog allowing a .sqlite file to be opened is displayed | As expected |
| “Quit” button pressed | Program ends | Program ends | As expected |
| **Add form functionality** |  |  |  |
| “Add” pressed with no value entered in input box | Error shown with valid input | Error shown with valid input | As expected |
| “Add” pressed with “-6” and “Litecoin” entered | Error shown with valid input | Error shown with valid input | As expected |
| “Add” pressed with 22 and “bitcoin” entered | Add form close. Main form shown with refreshed data | Add form close. Main form is shown with refreshed data | As expected |
| “Cancel” button pressed | Add form is closed. No changes to holdings | Add form is closed. No changes to holdings | As expected |
| **Edit form functionality** |  |  |  |
| “Edit” pressed with no value entered in input box | Error shown with valid input | Error shown with valid input | As expected |
| “Edit” pressed with “-6.5345” in input box and “bitcoin” selected | Error shown with valid input | Error shown with valid input | As expected |
| “Edit” pressed “12.74” in input box and “vertcoin” selected | Edit form close. Main form shown with updated data | Edit form is closed. Main form is shown with updated data | As expected |
| “Cancel” button pressed | Edit form is closed. No changes to holdings made | Edit form is closed. No changes to holdings made | As expected |
| **Generate pie chart form functionality** |  |  |  |
| “Save” button pressed | Pie chart of holdings saved to chosen directory as a .png | Pie chart of holdings saved to chosen directory as a .png | As expected |
| “Cancel” button pressed | Pie chart not created. Dialog is closed | Pie chart not created. Dialog is closed | As expected |
| **Open different folio functionality** |  |  |  |
| “Open” button pressed with no database selected | No action | No action | As expected |
| “Open” button pressed with database file selected | Database file is opened, read and displayed on main form | Database file is opened, read and displayed on main form | As expected |
| “Cancel” button pressed | Form closes, main is shown | Form closes, main is shown | As expected |
| **Save new file functionality** |  |  |  |
| “Save” button pressed | New database file is created with the specified name in the specified directory | New database file is created with the specified name in the specified directory and displayed in main form | As expected |
| “Cancel” pressed | Save form closes and main is shown. No changes made | Save form closes and main is shown. No changes made | As expected |
| **Quit button functionality** |  |  |  |
| “Quit” pressed | Program ends | Program ends | As expected |

# Compliance Testing

Here I will check the Functional and non-Functional requirements are all met

|  |  |
| --- | --- |
| **Functional Requirements** | **Satisfied** |
| Initial form requires a database to be selected or created | Yes |
| Edit or add balances for each coin | Yes |
| Total folio price displayed | Yes |
| Folio display currency can be changed (USD/GBP/EUR) | Yes |
| Can open different database file from main form | Yes |
| Can save current folio to new database file | Yes |
| Generate pie chart of different crypto holdings and output to external file | Yes |
| Displayed with GUI | Yes |
| Display current value of all currencies included | Yes |

|  |  |
| --- | --- |
| **Non-Functional Requirements** | **Satisfied** |
| Saved as a portable .exe file | Yes |
| Modular code | Yes |
| Clear Comments | Yes |
| Meaningful variable names | Yes |
| Low amount of processing power used | Yes – 5-10% CPU power used  200MB RAM usage |
| Small end file | Yes – 34.6MB |

# Beta Testing – Public Feedback

**Tom Mills**

Everything works fine, UI is fine, complex UIs are not important for this. The Pie chart work and the edit holdings works though it froze for me until I restarted the .exe. After that it was fine. The save/new function worked for me.

**Jenny Allan**

- found the program very easy to use

- the design/look of the program is incredibly easy to read

- like the ease of changing the currency so quickly

- tried both opening a new tracker and an existing one. The existing one was easy to find and had saved as it was left

- could have an option to take bitcoin/vertcoin/litecoin out of the holdings without having to work it out before

- could be an idea to display the pie chart when it is generated as well as saving it (easy to find when it has been saved

Based on this feedback, I am confident that the program works as intended on at least 4 systems (My own laptop and desktop, Mr Mills laptop and Ms Allans laptop), thus testing it’s robustness.